

## **REMARKS**

Claims 9 to 21 appear in this application for the Examiner's review and consideration. Claims 1 to 8 were canceled in a previous Amendment. Claims 15, 18, and 21 are withdrawn, as being directed to a non-elected species. The claims are fully supported by the specification and claims as originally filed. In particular, the recitations of the repair sleeve comprising openings in a shaft, the openings having first and second closed ends oriented towards the first and second shaft ends, respectively, and of inserting the repair sleeve into the guide thimble in the guide thimble opening in the top nozzle of the nuclear fuel assembly are supported by Figures 1 and 2 and page 3, lines 6 to 30, page 4, line 8, to page 6, line 9, page 6, lines 29 to 32, and page 7, lines 15 and 16, of the present specification. Therefore, there is no issue of new matter.

Claims 9 to 14, 16, 17, 19, and 20 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement, for the reasons set forth on pages 2 and 3 of the Final Office Action, under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement, as set forth on page 3 of the Final Office Action, and under 35 U.S.C. § 112, second paragraph, as being indefinite, for the reasons set forth on page 4 of the Final Office Action.

In particular, the Final Office Action objects to the recitation in claim 9 of the limitation "a tendon connecting the first closed end and the second closed end of each opening, such that the tendon bridges the first and second closed ends of each opening, dividing each opening into two portions." The Final Office Action states:

First, referring to applicant's figures (e.g., Fig. 2), the "first closed end", as set forth in the claim is the arched, top portion of the each of the two sleeve openings (sleeve opening is designated as element 28 in Fig. 1). The "second closed end" is the arched, lower portion of the each of the two sleeve openings. Note from Fig. 2 that tendon 66 is disposed between the two sleeve openings.

Thus, there is neither an adequate description nor enabling disclosure as to how and in what manner a tendon disposed between two top portions and between two bottom portions of adjacent sleeve openings (i.e., physically located outside either opening) can connect the top and bottom portions of each of the two sleeve openings.

Second, since the tendon is disposed outside either one of the two sleeve openings, there is also neither an adequate description nor enabling disclosure as to how and in what manner such tendon can divide each of these openings (i.e.,

individually) into so-called two portions. (emphasis in original)

The Final Office Action, thus, takes the position that the tendons disclosed in the present specification, and illustrated in Figures 1 and 2 of the present application are outside the sleeve openings in the repair sleeve used in the presently claimed method.

In response, Applicants submit that the present specification, at page 3, lines 11 to 13 and 24 to 26, teaches that the repair sleeve used in the presently claimed method has at least two openings and at least two tendons extending through the openings. At page 5, lines 2 and 3, in the description of Figure 1, the present specification teaches “[t]endons 20 may be positioned through the sleeve openings 28.”

It is well settled law that Applicants may be their own lexicographers. In the present application, Applicants have chosen to define the tendons as extending through the openings. As will be readily understood by those skilled in the art, this teaching of the present specification requires the openings that the Final Office Action finds to be separate openings to actually be two portions of the same opening that are separated by a tendon, as presently claimed.

Therefore, in light of the teaching of the present specification and the Figures, those skilled in the art would understand that the presently claimed tendons are not adjacent to the openings, but, instead, extend through the openings. As will be understood by one of ordinary skill in the art, the present specification teaches that any pair of openings that are both adjacent to a given tendon are considered to be the same opening that is bridged by, and divided into two portions by the tendon.

Based on the figures only, without consideration of the teaching of the present specification, the analysis in the Final Office Action of what constitutes an opening may be an alternate interpretation of what is illustrated in Figures 1 and 2. However, the clear teaching of the specification is that the tendons extend through the openings. Therefore, Figures 1 and 2 illustrate tendons that extend through the illustrated openings, and, thus, connect the first closed end and the second closed end of each opening, such that the tendon bridges the first and second closed ends of each opening, dividing each opening into two portions, as presently claimed. The two portions illustrated in the Figures 1 and 2 are improperly considered to be two separate openings in the Final Office Action.

In light of the teaching of the present specification, those skilled in the art will understand how to make and use the shaft used in the presently claimed method, where the shaft has at least two openings, each opening having a first closed end, oriented towards

the shaft first end, and a second closed end, oriented towards the shaft second end, and a tendon connecting the first closed end and the second closed end of each opening, such that the tendon bridges the first and second closed ends of each opening, dividing each opening into two portions, as presently claimed.

In addition, the claimed subject matter is described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention the present specification, and the claims particularly point out and distinctly claim the subject matter Applicants regard as the invention.

Therefore, the claims meet all the requirements of 35 U.S.C. § 112. Accordingly, it is respectfully requested that the Examiner withdraw the rejections of claims 9 to 14, 16, 17, 19, and 20 under 35 U.S.C. § 112, first and second paragraphs.

Claims 9 to 14, 16, 17, 19, and 20 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over U.S. Patent No. 4,751,039 to Delevallee et al. (Delevallee) in view of U.S. Patent No. 3,791,466 to Patterson et al. (Patterson), for the reasons set forth on pages 5 and 6 of the Final Office Action, as well as in the Final Office Action dated November 19, 2007, and the Response to Arguments on pages 4 and 5 of the Final Office Action. Applicants note that U.S. Patent No. 3,791,466 is again denoted as 4,699,759 in the Final Office Action, but was correctly referenced as 3,791,466 in the Notice of References Cited provided with the Office Action dated November 19, 2007.

In response, Applicants submit that the presently claimed invention is directed to a method for repairing a nuclear fuel assembly. The presently claimed method first comprises providing a repair sleeve. The repair sleeve has a shaft with a first end, a second end, and a diameter. The diameter of the shaft is configured to fit into a guide thimble in a guide thimble opening of a top nozzle of the fuel assembly. The guide thimble is connected to the top nozzle, where the diameter of the shaft is dimensioned, such that an exterior of the shaft fits into the guide thimble in the guide thimble opening.

The shaft has at least two openings, each opening having a first closed end, oriented towards the shaft first end, and a second closed end, oriented towards the shaft second end, and a tendon connecting the first closed end and the second closed end of each opening, such that the tendon bridges the first and second closed ends of each opening, dividing each opening into two portions. The tendons are configured to deflect in an instance of a horizontal load on the tendon during insertion, each of the tendons having at least one projection configured to be inserted into a dimple of a guide thimble sleeve. The

repair sleeve has a lapped edge for installation on the top of the top nozzle of the nuclear fuel assembly.

The second end of the shaft of the repair sleeve is inserted into the guide thimble in the guide thimble opening in the top nozzle of the nuclear fuel assembly, where the guide thimble is connected to the top nozzle, such that the second end of the tendon and the second end of the opening are inserted into the guide thimble before the first end of the tendon and the first end of the opening are inserted into the guide thimble, and the projections of the tendons project into the dimples of the guide thimble sleeve.

A thimble insert assembly is then into an interior of the repair sleeve.

It is well settled law that a *prima facie* case of obviousness requires the citation of prior art that discloses or suggests all of the elements of the claimed invention, and provides a reason for one of ordinary skill in the art to modify the prior art to obtain the claimed invention. Therefore, to be within the scope of the present claims, the prior art must disclose or suggest a method for repairing a nuclear fuel assembly, comprising:

Providing a repair sleeve;

Inserting the second end of the shaft of the repair sleeve into a guide thimble in the guide thimble opening in the top nozzle of the nuclear fuel assembly; and

Inserting a thimble insert assembly into the interior of the repair sleeve.

To be within the scope of the present claims, the cited art must also disclose or suggest all of the characteristics and interconnections of the components recited in the claims to the presently claimed method, including the repair sleeve, the shaft of the repair sleeve, the openings in the shaft, the tendons, the top nozzle of the fuel assembly, the guide thimble, and the thimble insert assembly.

Applicants respectfully submit that none of the art cited during the prosecution of the present application, whether taken alone or in combination, discloses or suggests all of the elements of the presently claimed method, and, thus, the Final Office Action fails to provide a *prima facie* case for obviousness. In addition, the cited references fail to provide any reason for one of ordinary skill in the art to modify the prior art to obtain the presently claimed method.

Delevallee discloses a method for installing a sleeve within an instrument tube of a nuclear fuel assembly. As illustrated in Figure 1 of Delevallee, the nuclear fuel assembly includes an instrumentation tube 18. Delevallee, column 2, line 66, to column 3, line 3. The instrumentation tube 18 is inserted into a sleeve or thimble 22, and may be fixed to the sleeve or thimble by internal expansion of the instrumentation tube 18. Delevallee,

column 3, lines 7 to 14, and Figures 1 and 2. The instrumentation tube 18 contains a “glove finger” 26 within the internal diameter of the instrumentation tube 18, where the “glove finger” 26 has a diameter that is “considerably less than the internal diameter of the instrumentation tube 18.” Delevallee, column 3, lines 21 to 30.

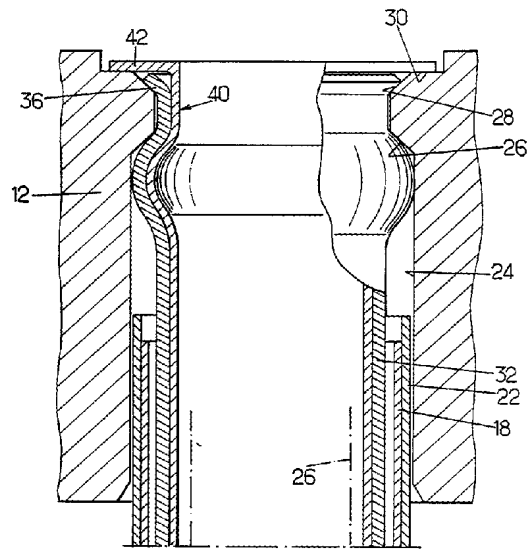
In the method disclosed by Delevallee, the instrumentation tube 18 is lined with a sleeve to reduce the amplitude of vibrations of the “glove finger” 26, overcoming the risk of leaks. Delevallee, column 3, lines 38 to 43. The instrumentation tube 18 is lined with an additional sleeve that is centered in the instrumentation tube, and can be expanded and deformed for centering. Delevallee, column 3, lines 44 to 57.

In the disclosed method, the additional sleeve is a lining sleeve 32, inserted into the instrumentation tube 18. Delevallee, column 4, lines 7 to 9. The sleeve 32 is then radially bulged to give the sleeve 32 “a low amplitude pre-expansion” to hold the sleeve 32 in position during the steps preceding final connection, where the radial expansion may be carried out using a spreading tool with four expandable jaws, and does not deform instrumentation tube 18. Delevallee, column 4, lines 10 to 24, and Figures 2 and 3.

A cap 40 is then inserted into the lining sleeve 32 to permanently interlock the sleeve 32 and the nozzle 12 of the fuel assembly. The Final Office Action maintains the position of the previous Office Actions that the cap 40 corresponds to the repair sleeve of the presently claimed invention.

The cap 40 is not the repair sleeve of the presently claimed method, and Delevallee does not disclose or suggest providing a repair sleeve, inserting the second end of the shaft of the repair sleeve into a guide thimble in the guide thimble opening in the top nozzle of the nuclear fuel assembly, and inserting a thimble insert assembly into the interior of the repair sleeve, where the projections on the tendons of the shaft of the repair sleeve project into the dimples of the guide thimble sleeve, as presently claimed.

The cap 40 disclosed by Delevallee does not have the openings and tendons of the presently claimed repair sleeve shaft, and is not inserted into a guide thimble, such that projections on the tendons of the shaft of the repair sleeve project into the dimples of the guide thimble sleeve. Instead, Delevallee discloses inserting the cap 40 into the lining sleeve 32, which is inserted into the instrumentation tube 18, which is inserted into the sleeve or thimble 22. There are no projections on the cap 40 that project into dimples in the sleeve to thimble 22, as there is no contact between the cap 40 and the thimble 22. The lining sleeve 32 and the instrumentation tube 18 intervene. This is clearly illustrated in Figure 4 of Delevallee.



Patterson does nothing to overcome the deficiencies of Delevallee. Patterson discloses a low parasitic structure fuel assembly. The fuel assembly includes top, bottom, and intermediate grid members that align and support fuel rods, hollow tubular members containing control rods, and an instrumentation tube 27. Patterson, column 2, lines 51 to 67, and Figures 1 and 2. A stainless steel sleeve 58, as cited by the Final Office Action, and illustrated in Figure 11, is brazed to the top grid 22, where the sleeve 58 has four slots 60 at 90° intervals to allow a slight deformation of the sleeve 58, such that the sleeve fits within the top grid 22. Patterson, column 5, lines 3 to 16. A thimble tube 18 is inserted into the brazed sleeve 58. Patterson, column 5, lines 19 to 30, and Figure 10.

The sleeve 58 is not the repair sleeve of the presently claimed method, and Patterson does not disclose or suggest providing a repair sleeve, inserting the second end of the shaft of the repair sleeve into a guide thimble in the guide thimble opening in the top nozzle of the nuclear fuel assembly, and inserting a thimble insert assembly into the interior of the repair sleeve, where the projections on the tendons of the shaft of the repair sleeve project into the dimples of the guide thimble sleeve, as presently claimed. Instead, Patterson discloses a guide thimble inserted into the sleeve 58.

Even if one of ordinary skill in the art combined the disclosure of Patterson with that of Delevallee, such that slots were provided in the cap 40 of Delevallee, the combination would not provide the presently claimed method. As stated above, Delevallee discloses inserting the cap 40 into the lining sleeve 32, which is inserted into the instrumentation tube 18, which is inserted into the sleeve or thimble 22. There are no projections on the cap 40 that project into dimples in the sleeve to thimble 22, as there is

no contact between the cap 40 and the thimble 22. The lining sleeve 32 and the instrumentation tube 18 intervene.

Delevallee and Patterson, whether taken alone or in combination, do not disclose or suggest providing a repair sleeve, inserting the second end of the shaft of the repair sleeve into a guide thimble in the guide thimble opening in the top nozzle of the nuclear fuel assembly, and inserting a thimble insert assembly into the interior of the repair sleeve, where the projections on the tendons of the shaft of the repair sleeve project into the dimples of the guide thimble sleeve, as presently claimed, and fail to provide any reason for one of ordinary skill in the art to do so.

Therefore, as the Delevallee and Patterson, whether taken alone or in combination, fail to disclose or suggest the presently claimed method, and fail to provide one of ordinary skill in the art with any reason to obtain the claimed method, the present claims are not obvious over those references. Accordingly, it is respectfully requested that the Examiner withdraw the rejection of claims 9 to 14, 16, 17, 19, and 20 under 35 U.S.C. § 103(a) over Delevallee and Patterson.

Applicants thus submit that the entire application is now in condition for allowance, an early notice of which would be appreciated. Should the Examiner not agree with Applicants' position, a personal or telephonic interview is respectfully requested to discuss any remaining issues prior to the issuance of a further Office Action, and to expedite the allowance of the application.

No fee is believed to be due for the filing of this Amendment. Should any fees be due, however, please charge such fees to Deposit Account No. 11-0600.

Respectfully submitted,

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Dated: October 20, 2008

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